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 NEWS  1           Web Page URLs for STN Seminar Schedule - N. America
 NEWS  2           "Ask CAS" for self-help around the clock
 NEWS  3  DEC 21   IPC search and display fields enhanced in CA/CAplus with the
                   IPC reform
 NEWS  4  DEC 23   New IPC8 SEARCH, DISPLAY, and SELECT fields in USPATFULL/
                   USPAT2
 NEWS  5  JAN 13   IPC 8 searching in IFIPAT, IFIUDB, and IFICDB
 NEWS  6  JAN 13   New IPC 8 SEARCH, DISPLAY, and SELECT enhancements added to
                   INPADOC
 NEWS  7  JAN 17   Pre-1988 INPI data added to MARPAT
 NEWS  8  JAN 17   IPC 8 in the WPI family of databases including WPIFV
 NEWS  9  JAN 30   Saved answer limit increased
 NEWS 10  JAN 31   Monthly current-awareness alert (SDI) frequency
                   added to TULSA
 NEWS 11  FEB 21   STN AnaVist, Version 1.1, lets you share your STN AnaVist
                   visualization results
 NEWS 12  FEB 22   Status of current WO (PCT) information on STN
 NEWS 13  FEB 22   The IPC thesaurus added to additional patent databases on STN
 NEWS 14  FEB 22   Updates in EPFULL; IPC 8 enhancements added
 NEWS 15  FEB 27   New STN AnaVist pricing effective March 1, 2006
 NEWS 16  FEB 28   MEDLINE/LMEDLINE reload improves functionality
 NEWS 17  FEB 28   TOXCENTER reloaded with enhancements
 NEWS 18  FEB 28   REGISTRY/ZREGISTRY enhanced with more experimental spectral
                   property data
 NEWS 19  MAR 01   INSPEC reloaded and enhanced
 NEWS 20  MAR 03   Updates in PATDPA; addition of IPC 8 data without attributes
 NEWS 21  MAR 08   X.25 communication option no longer available after June 2006
 NEWS 22  MAR 22   EMBASE is now updated on a daily basis

 NEWS EXPRESS  FEBRUARY 15 CURRENT VERSION FOR WINDOWS IS V8.01a,
               CURRENT MACINTOSH VERSION IS V6.0c(ENG) AND V6.0Jc(JP),
               AND CURRENT DISCOVER FILE IS DATED 19 DECEMBER 2005.
               V8.0 AND V8.01 USERS CAN OBTAIN THE UPGRADE TO V8.01a AT
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=> s carbon (8w) black (s) silicon (p) (sensor or detector)
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FIELD CODE - 'AND' OPERATOR ASSUMED 'SILICON (P) '
PROXIMITY OPERATOR LEVEL NOT CONSISTENT WITH
FIELD CODE - 'AND' OPERATOR ASSUMED 'SILICON (P) '
L1          36 CARBON (8W) BLACK (S) SILICON (P) (SENSOR OR DETECTOR)

=> display l1 1-36 ibib abs

L1   ANSWER 1 OF 36  CAPLUS  COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER:         2005:953281  CAPLUS
DOCUMENT NUMBER:          143:241014
TITLE:                    Modeling chemiresistor sensors 1: conductivity model
AUTHOR(S):                Lei, Hua; Pitt, William G.; McGrath, Lucas K.; Ho,
                          Clifford K.
CORPORATE SOURCE:         Department of Chemical Engineering, Brigham Young
                          University, Provo, UT, 84602, USA
SOURCE:                   AIChE Annual Meeting, Conference Proceedings, Austin,
                          TX, United States, Nov. 7-12, 2004 (2004),
                          041F/1-041F/8.  American Institute of Chemical
                          Engineers: New York, N. Y.
                          CODEN: 69GSKT; ISBN: 0-8169-0965-2
DOCUMENT TYPE:            Conference; (computer optical disk)
LANGUAGE:                 English
AB   Chemiresistor sensors made from carbon black-polyisobutylene composite,
     perform based on the change of the resistivity of the composite when they
     swell in the analytes.  Two models are necessary to describe the mechanism
     of carbon-polymer chemiresistors theor.: the conductivity model and the
thermodn.
     model.  The conductivity model was studied.  Sixty-four chemiresistors
     representing 8 different carbon concns. (8 to 60 volume% carbon) were
     constructed by depositing thin films of a carbon black/polyisobutylene
     composite onto concentric spiral platinum electrodes.  The impact of
     carbon concentration and geometry on the measured resistance and derived
     resistivity of the polymer composite was determined  The thickness and surface
     topog. of each sensor was measured with a mech. profilometer.  The derived
     resistivity data fit the general effective media (GEM) model adequately,
     and the fitted parameters predicted values for percolation threshold and
     carbon resistivity that were consistent with published literature.  Finite
     element modeling showed that resistivity was a strong function of
     composite composition and thickness, but was relatively insensitive to the
     surface roughness of the composite on the sensor.  The correlations
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developed can be used in reverse to calculate the thickness of the composite polymer film deposited on the solid substrate from a measurement of resistance in dry air.

REFERENCE COUNT: 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L1 ANSWER 2 OF 36 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2005:511475 CAPLUS
DOCUMENT NUMBER: 144:246067
TITLE: Portable electronic nose system based on the carbon black-polymer composite sensor array
AUTHOR(S): Kim, Yong Shin; Ha, Seung-Chul; Yang, Yoonseok; Kim, Young Jun; Cho, Seong Mok; Yang, Haesik; Kim, Youn Tae
CORPORATE SOURCE: Bio-MEMS Team, Electronics and Telecommunications Research Institute, Daejeon, 305-350, S. Korea
SOURCE: Sensors and Actuators, B: Chemical (2005), B108(1-2), 285-291
CODEN: SABCEB; ISSN: 0925-4005
PUBLISHER: Elsevier B.V.
DOCUMENT TYPE: Journal
LANGUAGE: English
AB A portable electronic nose system based on personal digital apparatus was developed by using the vapor detection array made of carbon black-polymer composites and the user software, such as data acquisition and pattern recognition. The gas sensor array is possible to have maximum 16 sensing elements integrated on the same silicon substrate. The individual element has a Si bulk-micromachined well which allows the polymer-carbon black composite solution to be placed reproducibly in a specific and well-constrained area during the drop-coating process. Preliminary results show that the authors' portable electronic nose system has successfully classified simple volatile organic compds., and the complex liquor samples of brandy and whiskey.
REFERENCE COUNT: 15 THERE ARE 15 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L1 ANSWER 3 OF 36 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2005:451916 CAPLUS
DOCUMENT NUMBER: 144:246063
TITLE: Portable electronic nose system utilizing single gas sensor array fabricated by Si bulk micromachining
AUTHOR(S): Yang, Yoonseok; Ha, Seung-Chul; Kim, Yong Shin
CORPORATE SOURCE: Bio-MEMS Team, Electronics and Telecommunications Research Institute, Daejeon, 305-350, S. Korea
SOURCE: Sensors and Materials (2005), 17(2), 077-085
CODEN: SENMER; ISSN: 0914-4935
PUBLISHER: Scientific Publishing Division of MYU K.K.
DOCUMENT TYPE: Journal
LANGUAGE: English
AB A portable electronic nose system was developed using a single 16-channel sensor array chip. It was fabricated by Si bulk micromachining and equipped with the sensing materials of carbon-black-polymer composites. This system consists of a small sensing module containing the sensor array chip, signal processing circuits and vapor delivery components on a printed circuit board, and a laptop personal computer equipped with data acquisition and pattern recognition programs. The sensor array chip can measure and recognize volatile organic compds. even by simple principle component anal. The authors' portable electronic nose system has successfully classified real complex samples, i.e., brandy and whiskey.
REFERENCE COUNT: 15 THERE ARE 15 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L1 ANSWER 4 OF 36 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2004:1058917 CAPLUS
DOCUMENT NUMBER: 142:15906

TITLE: Humidity sensor element containing polyphenylsulfone
INVENTOR(S): Schultz, Gerald
PATENT ASSIGNEE(S): General Electric Company, USA
SOURCE: U.S. Pat. Appl. Publ., 6 pp.
CODEN: USXXCO
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2004244482	A1	20041209	US 2003-250084	20030603
US 6938482	B2	20050906		
PRIORITY APPLN. INFO.:			US 2003-250084	20030603

AB A humidity sensor element for a humidity sensing device includes a rigid, p-doped silicon substrate, a nonporous terminal on one side of the substrate, a porous terminal on a 2nd side of the substrate, and a layer of polyphenylsulfone between the porous terminal and the substrate. The sensor element displays improved linear response with humidity changes and very low hysteresis.

L1 ANSWER 5 OF 36 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2004:712122 CAPLUS
DOCUMENT NUMBER: 141:405373
TITLE: Environmental temperature-independent gas sensor array based on polymer composites
AUTHOR(S): Ha, Seung-Chul; Kim, Yong Shin; Yang, Yoonseok; Kim, Young Jun; Cho, Seong-Mok; Yang, Haesik; Kim, Youn Tae
CORPORATE SOURCE: Bio MEMS Group, Electronics and Telecommunications Research Institute, Dae jeon, 305-350, S. Korea
SOURCE: Chemical Sensors (2004), 20(Suppl. B), 48-49
CODEN: KAGSEU
PUBLISHER: Denki Kagakkai Kagaku Sensa Kenkyukai
DOCUMENT TYPE: Journal
LANGUAGE: English

AB This paper reports a new fabrication method and a performance of polymer-**carbon black** composite based gas **sensor** array fabricated on a double-side polished 5-in. **silicon** wafer. A bulk micromachining technique is employed to create microhotplate structure that provides effective thermal isolation and a micromachined well to contain polymer composite-solvent solution Microbeaters were embedded to maintain **sensors** to be thermostatted at the constant temperature of 38°. Polymer composite **sensor** array responded diversely when they were dispensed in micromachined wells and exposed to various different chemical gases. And temperature effect on the response of **sensor** array was studied.

REFERENCE COUNT: 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L1 ANSWER 6 OF 36 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2004:426158 CAPLUS
DOCUMENT NUMBER: 142:66282
TITLE: Resistivity measurements of carbon-polymer composites in chemical sensors: impact of carbon concentration and geometry
AUTHOR(S): Lei, Hua; Pitt, William G.; McGrath, Lucas K.; Ho, Clifford K.
CORPORATE SOURCE: Department of Chemical Engineering, Brigham Young University, Provo, UT, 84602, USA
SOURCE: Sensors and Actuators, B: Chemical (2004), B101(1-2), 122-132
CODEN: SABCEB; ISSN: 0925-4005
PUBLISHER: Elsevier Science B.V.

DOCUMENT TYPE: Journal
LANGUAGE: English
AB Chemiresistor **sensors** comprised of conductive polymer composites have shown great potential in identifying gaseous analytes. The performance of these **sensors** depends on a number of parameters, including the geometry and concentration of the conductive component dispersed in the polymer. In this study, 64 chemiresistors representing eight different carbon concns. (8-60 volume% carbon) were constructed by depositing thin films of a **carbon black** -polyisobutylene composite onto concentric spiral platinum electrodes on a **silicon** chip. The impact of carbon concentration and geometry on the measured resistance and derived resistivity of the polymer composite was determined The thickness and surface topog. of each **sensor** was measured with a mech. profilometer, and the resistance of each **sensor** was measured in dry air at room temperature Finite element modeling was used to correlate the thickness and measured elec. resistance with the intrinsic resistivity of the polymer-carbon composite. The derived resistivity data fit the general effective media (GEM) model adequately, and the fitted parameters predicted values for percolation threshold and carbon resistivity that were consistent with published literature. Further finite element modeling showed that resistivity was a strong function of composite composition and thickness, but was relatively insensitive to the surface roughness of the composite on the **sensor**. The correlations developed herein can be used in reverse to calculate the thickness of the composite polymer film deposited on the solid substrate from a measurement of resistance in dry air.
REFERENCE COUNT: 35 THERE ARE 35 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L1 ANSWER 7 OF 36 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2001:23725 CAPLUS
DOCUMENT NUMBER: 134:231283
TITLE: Micromachined polymer-based chemical gas sensor array
AUTHOR(S): Zee, F.; Judy, J. W.
CORPORATE SOURCE: Electrical Engineering Department, University of California Los Angeles, Los Angeles, CA, 90095-1594, USA
SOURCE: Sensors and Actuators, B: Chemical (2001), B72(2), 120-128
CODEN: SABCEB; ISSN: 0925-4005
PUBLISHER: Elsevier Science S.A.
DOCUMENT TYPE: Journal
LANGUAGE: English
AB The authors have developed a miniature polymer-based chemical gas sensor array on silicon using micromachining technol. The sensors are polymer-carbon black composite films, which swell reversibly and cause a resistance change upon exposure to a wide variety of gases. The authors have fabricated two types of devices which can measure this resistance change using a well design. These wells contain the polymer-carbon black-solvent liquid volume present during deposition and allow the sensor film to be placed reproducibly in a specific and well-constrained area. After deposition, the solvents evaporate and leave behind a polymer-carbon black residue crust between metal leads on each side of the well. Two types of devices, a bulk micromachined sensor and a patterned thick-film sensor, were fabricated, ranging in size from 500 μm+600 μm to 100 μm+100 μm. Since the composite film sensors are not specific to any one gas, an array of these sensors, each with a different sensing film, is used to identify gases and gas mixts. through the pattern response of the array. Six polymer-carbon black composite films were deposited into the sensor array and exposed to three chemical gases at five different concentration levels. The sensors were able to uniquely detect these gas vapors and demonstrated a linear response to concentration levels between 2000 and 10,000 ppm. Also a reduction in sensor area by an order of magnitude

(from 4.32 to 0.30 mm2) does not reduce sensor response. This design allows the integration of circuits to process the changes in resistance which will permit the realization of a completely integrated miniature gas sensor.
REFERENCE COUNT: 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L1 ANSWER 8 OF 36 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1990:525754 CAPLUS
DOCUMENT NUMBER: 113:125754
TITLE: Chemically actuated electronic switch
AUTHOR(S): Neuburger, Glen G.; Warren, P. C.
CORPORATE SOURCE: Bell Commun. Res., Red Bank, NJ, 07701, USA
SOURCE: Sensors and Actuators, B: Chemical (1990), B1(1-6), 326-32
CODEN: SABCEB; ISSN: 0925-4005
DOCUMENT TYPE: Journal
LANGUAGE: English
AB A new liquid phase chemical sensor is described based on the swelling of an elec. conductive polymer composite, where the polymer matrix serves as the chemical sensing element, and a conductive filler is used solely to achieve film volume resistivities, ρ, of <10 Ω cm in an unswollen state. In the presence of a solvent with a large solvent-polymer interaction coefficient the polymer swells to such an extent that elec. conduction is highly impeded, i.e ρ > 109 Ω cm, by the increased separation between conducting microstructures. A typical system is demonstrated for the detection of low mol. weight hydrocarbons using a carbon black/silicone elastomer composite. For such systems the swelling is reversible upon elimination of solvent; and, switching times <1 s are commonly observed for a thin-film sensor. The response is also discussed for two component mixts. comprised of swelling and non-swelling and non-swelling agents.

L1 ANSWER 9 OF 36 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1990:58918 CAPLUS
DOCUMENT NUMBER: 112:58918
TITLE: Manufacture of humidity sensors for hygrometers
INVENTOR(S): Ikejiri, Masahisa; Yanagisawa, Michio
PATENT ASSIGNEE(S): Seiko Epson Corp., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 4 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 01183439	A2	19890721	JP 1988-4519	19880112

PRIORITY APPLN. INFO.: JP 1988-4519 19880112
AB C particles are dispersed in a sol, prepared by hydrolysis of Si alkoxide at a H2O/alkoxide mol ratio 0.5-2, the sol is cast on an insulated substrate, gelled, dried, and sintered to obtain the title sensor. These sensors have linear humidity-log R correspondence, where R is the resistance of the sensor.

L1 ANSWER 10 OF 36 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1985:610433 CAPLUS
DOCUMENT NUMBER: 103:210433
TITLE: Severinghaus-type gas sensor
PATENT ASSIGNEE(S): Kuraray Co., Ltd., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 10 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 60125558	A2	19850704	JP 1983-233365	19831209
JP 04000223	B4	19920106		
PRIORITY APPLN. INFO.:			JP 1983-233365	19831209

AB In a Severinghaus-type gas sensor containing a H+-sensitive, narrow field-effect transistor converter, a Ag-AgCl reference electrode, an insulating tube for the field-effect transistor converter and the reference electrode, a hydrophilic, gas-permeable polymer layer that covers the reference electrode and the gate of the field-effect transistor converter, and a gas-permeable, C black-containing silicone rubber membrane that covers the polymer layer, the silicone rubber membrane has <10% light transmissivity at 400-1200 nm, a p/d value of 2.5 + 10-7 cm3 (STP)/cm2 s cm Hg (where p = N gas permeability coefficient, d = membrane thickness), and a dc/s value in the range of 0.01 ≤ dc/s ≤ 0.50 [where d = membrane thickness (μm), s = C black particle size (Å), c = weight ratio of C black in silicone rubber]. The gas sensor was inserted into blood vessels for anal. of CO2, NH3, and other gases in blood for clin. anal. The sensor was light resistant.

L1 ANSWER 11 OF 36 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2006:8713594 INSPEC
TITLE: Portable electronic nose system based on the carbon black-polymer composite **sensor** array
AUTHOR: Yong Shin Kim; Seung-Chul Ha; Yoonseok Yang; Young Jun Kim; Seong Mok Cho; Haesik Yang; Youn Tae Kim (Electron. & Telecommun. Res. Inst., Daejeon, South Korea)
SOURCE: Sensors and Actuators B (Chemical) (22 July 2005), vol.108, no.1-2, p. 285-91, 15 refs.
CODEN: SABCEB, ISSN: 0925-4005
SICI: 0925-4005(20050722)108:1/2L.285:PENS;1-Z
Doc.No.: S0925-4005(04)00835-4
Published by: Elsevier, Switzerland
DOCUMENT TYPE: Journal
TREATMENT CODE: Practical; Experimental
COUNTRY: Switzerland
LANGUAGE: English
AN 2006:8713594 INSPEC
AB A portable electronic nose system based on personal digital apparatus has been developed by using the vapor detection array made of **carbon black**-polymer composites and the user software, such as data acquisition and pattern recognition. The gas **sensor** array is possible to have maximum 16 sensing elements integrated on the same **silicon** substrate. The individual element has a Si bulk-micromachined well which allows the polymer-**carbon black** composite solution to be placed reproducibly in a specific and well-constrained area during the drop-coating process. Preliminary results show that our portable electronic nose system has successfully classified simple volatile organic compounds, and the complex liquor samples of brandy and whisky.

L1 ANSWER 12 OF 36 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2005:8659956 INSPEC
TITLE: Conductive silicone based MEMS **sensor** and actuator
AUTHOR: Huang, A.; Tak Sing Wong, V.; Chih-Ming Ho (Dept. of Mech. & Aerosp. Eng., California Univ., Los Angeles, CA, USA)
SOURCE: TRANSDUCERS '05. The 13th International Conference on Solid-State Sensors, Actuators and Microsystems.

Digest of Technical Papers (IEEE Cat. No. 05TH8791), Vol. 2, 2005, p. 1406-11 Vol. 2 of 2 vol. (xxxix+2162) pp., 11 refs.
ISBN: 0 7803 8994 8
Price: 0 7803 8994 8/2005/$20.00
Published by: IEEE, Piscataway, NJ, USA
Conference: TRANSDUCERS '05. The 13th International Conference on Solid-State Sensors, Actuators and Microsystems. Digest of Technical Papers, Seoul, South Korea, 5-9 June 2005
Sponsor(s): Korean Sensors Soc
DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Practical; Experimental
COUNTRY: United States
LANGUAGE: English
AN 2005:8659956 INSPEC
AB In this paper, we have demonstrated the fabrication and preliminary characterization of SU-8 patterned conductive silicone polymer MEMS **sensor** and actuator; in the form of a suspended cross-beam accelerometer and an electrostatic fluidic valve. By integrating our recently developed silicone/**carbon black** composite patterning technique with surface and bulk micromachining technologies, we have exploited the material properties of conductive silicone polymers for active/passive MEMS devices. The cross-beam dimensions of the accelerometer are 7mm + 400μm + 25μm with a 500μm + 500μm + 250μm **silicon** proof mass at the center. Various sizes of the silicone valves (2 electrodes) and pumps (3 electrodes) were fabricated, with the smallest design for the pump measuring 600μm + 3mm + 35μm. Further size reduction to yield pumps and valves in the order of a hundred micron is possible with our developed fabrication technique

L1 ANSWER 13 OF 36 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2005:8649524 INSPEC
TITLE: A matched-profile method for simple and robust vapor recognition in electronic nose (E-nose) system
AUTHOR: Yoon Seok Yang; Seung-Chul Ha; Yong Shin Kim (Basic Res. Lab., Electron. & Telecommun. Res. Inst., Daejeon, South Korea)
SOURCE: Sensors and Actuators B (Chemical) (29 April 2005), vol.106, no.1, p. 263-70, 9 refs.
CODEN: SABCEB, ISSN: 0925-4005
SICI: 0925-4005(20050429)106:1L.263:MPMS;1-4
Doc.No.: S0925-4005(04)00531-3
Published by: Elsevier, Switzerland
DOCUMENT TYPE: Journal
TREATMENT CODE: Theoretical
COUNTRY: Switzerland
LANGUAGE: English
AN 2005:8649524 INSPEC
AB The vapor recognition performance of electronic nose (E-nose) system can be improved by manipulating the **sensor** array responses of vapors in profile forms. The **sensor** array composed of various **carbon-black** (CB) polymer composites shows featured response profile patterns, varied from vapors to vapors due to different chemical interactions between the arrayed materials and the vapors. These multidimensional sensory data gives more information than collection of the piecemeal signal features, i.e., maximum sensitivity, signal slopes, rising-time. To use them in vapor recognition task, we proposed a novel matched-profile method was proposed, which is based on the typical digital image pattern matching. The degrees of matching between eight different vapors were evaluated by using the proposed method. The vapor responses are measured by the **silicon**-based gas **sensor** array with 16 CB polymer composites installed in membrane structure. The

results showed higher contrast between matching and non-matching vapors than conventional method. This implies reliable vapor recognition in E-nose system. [All rights reserved Elsevier]

L1 ANSWER 14 OF 36 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2005:8649427 INSPEC
TITLE: Integrated and microheater embedded gas **sensor** array based on the polymer composites dispensed in micromachined wells
AUTHOR: Seung-Chul Ha; Yong Shin Kim; Yoonseok Yang; Young Jun Kim; Seong-Mok Cho; Haesik Yang; Youn Tae Kim (Bio MEMS Group, Electron. & Telecommun. Res. Inst., Taejon, South Korea)
SOURCE: Sensors and Actuators B (Chemical) (28 March 2005), vol.105, no.2, p. 549-55, 13 refs.
CODEN: SABCEB, ISSN: 0925-4005
SICI: 0925-4005(20050328)105:2L.549:IMES;1-K
Doc.No.: S0925-4005(04)00034-6
Published by: Elsevier, Switzerland
DOCUMENT TYPE: Journal
TREATMENT CODE: New Development; Theoretical; Experimental
COUNTRY: Switzerland
LANGUAGE: English
AN 2005:8649427 INSPEC
AB This paper reports a new fabrication method and a performance of miniaturized and temperature-controllable gas **sensor** array constructed on 5in. double side polished (100) **silicon** wafer. The films of polymer-**carbon black** composite were used as gas **sensors**. Both **silicon** process and bulk micromachining technology were employed to fabricate **sensor** array equipped with an interdigitated electrode pair, microheater, and micromachined well of an area of 2mm+2mm. During dispensing a polymer composite-solvent solution on the electrode, micromachined well helped the **sensor** film be placed in a constrained area and be formed reproducibly from a constant volume of the polymer composite-solvent solution. The dimension of a **sensor** array chip consisting of 16 separate **sensors** is 30mm+14mm. The **sensors** of polymer-**carbon black** composite responded diversely when they were dispensed in micromachined wells and exposed to various chemical vapors. Principal component analysis (PCA) clearly demonstrated that the gas **sensor** array could identify various chemical vapors. Pt microheater consumed 7mW to heat **sensor** film at the operating temperature of 40°C, and temperature reached a steady maximum value promptly because of its small heat capacity and effective thermal isolation. The electrical resistance of polymer composite **sensor** and the partition coefficients for **sensor**-vapor interactions showed to be considerably affected by the substrate temperature. [All rights reserved Elsevier]

L1 ANSWER 15 OF 36 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2005:8477323 INSPEC
DOCUMENT NUMBER: A2005-16-8280T-011; B2005-08-7230L-074
TITLE: SU-8 lift-off patterned silicone chemical vapor **sensor** arrays
AUTHOR: Wong, V.T.S.; Huang, A.; Chih-Ming Ho (Dept. of Mech. & Aerosp. Eng., California Univ., Los Angeles, CA, USA)
SOURCE: 18th IEEE International Conference on Micro Electro Mechanical Systems (IEEE Cat. No.05CH37610), 2005, p. 754-7 of xxxvii+886 pp., 11 refs.
ISBN: 0 7803 8732 5
Price: 0 7803 8732 5/2005/$20.00
Published by: IEEE, Piscataway, NJ, USA
Conference: 18th IEEE International Conference on

Micro Electro Mechanical Systems, Miami Beach, FL, USA, 30 Jan.-3 Feb. 2005
DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Practical; Experimental
COUNTRY: United States
LANGUAGE: English
AN 2005:8477323 INSPEC DN A2005-16-8280T-011; B2005-08-7230L-074
AB This paper reports on the fabrication and preliminary characterizations of our micromachined silicone/**carbon black** chemical vapor **sensor** arrays. By utilizing SU-8 lift-off technique, we have successfully patterned room temperature vulcanizing (RTV) polymers down to 25 μm feature size using low resolution mask (with line-width of 5-10μm) with yields in excess of 90% throughout a 4' **silicon** wafer. Based on this technique, we have fabricated the smallest functional polymer/**carbon black** based chemical vapor **sensor** (60+60+25μm3) reported in the literature known to the authors thus far. Preliminary characterizations showed that the **sensors** are capable of sensing alcohols and acetone in the range from 2.5ppth to 12.5ppth with response time down to 5 seconds

L1 ANSWER 16 OF 36 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2005:8373202 INSPEC
DOCUMENT NUMBER: B2005-06-7230L-002
TITLE: Ultrafast chemical-sensing microsystem employing resistive nanomaterials
AUTHOR: Tan, S.L.; Covington, J.A.; Gardner, J.W. (Sch. of Eng., Univ. of Warwick, Coventry, UK)
SOURCE: Proceedings of the SPIE - The International Society for Optical Engineering (2004), vol.5389, no.1, p. 366-76, 25 refs.
CODEN: PSISDG, ISSN: 0277-786X
SICI: 0277-786X(2004)5389:1L.366:UCSM;1-C
Price: 0277-786X/04/$15.00
Published by: SPIE-Int. Soc. Opt. Eng, USA
Conference: Smart Structures and Materials 2004. Smart Electronics, MEMS, BioMEMS, and Nanotechnology, San Diego, CA, USA, 15-18 March 2004
DOCUMENT TYPE: Conference; Conference Article; Journal
TREATMENT CODE: Application; Practical; Experimental
COUNTRY: United States
LANGUAGE: English
AN 2005:8373202 INSPEC DN B2005-06-7230L-002
AB This paper reports a novel ultra-fast chemosensor array microsystem for the rapid detection of volatile organic compounds (VOCs). The sensing device consists of an array of 80 miniature resistive **sensors** on a 10 mm by 10 mm **silicon** substrate, configured in 5 rows of 16 elements. In this application each row has been deposited with a different **carbon black**/polymer composite nanomaterial. As a result of arranging the **sensors** in the matrix fashion, we are able to represent the **sensor** response as an olfactory image. The **sensor** array was tested with pulses of ethanol, toluene, toluene and ethanol mixture, milk, cream, cypress oil and peppermint oil at two different flow rates (60 and 130 ml/min) and three different pulse widths (10, 25, and 50 sees). Preliminary analysis was performed by comparing different images which showed excellent discrimination between the different analytes. Increasing the pulse width and flow rate improved the discrimination capability of the system. We have also investigated the effect of 'stereo' olfactory imaging by combining mono images measured at different flow rates to form a composite image. Results have shown such scheme can provide additional discriminatory information

L1 ANSWER 17 OF 36 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2005:8367529 INSPEC
DOCUMENT NUMBER: A2005-11-8115L-030; B2005-05-0520J-064
TITLE: Fabrication and characterization of carbon nanoparticles for polymer based vapor **sensors**
AUTHOR: Quercia, L.; Loffredo, F.; Alfano, B.; La Ferrara, V.; Di Francia, G. (Centro Ricerche Portici, ENEA, Portici, Italy)
SOURCE: Sensors and Actuators B (Chemical) (1 June 2004), vol.B100, no.1-2, p. 22-8, 15 refs.
CODEN: SABCEB, ISSN: 0925-4005
SICI: 0925-4005(20040601)B100:1/2L.22:FCCN;1-G
Price: 0925-4005/2004/$30.00
Published by: Elsevier, Switzerland
Conference: New Materials and Technologies in Sensor Applications - Symposium N of the EMRS Conference 2003, Strasbourg, France, 10-13 June 2003
DOCUMENT TYPE: Conference; Conference Article; Journal
TREATMENT CODE: Practical; Experimental
COUNTRY: Switzerland
LANGUAGE: English
AN 2005:8367529 INSPEC DN A2005-11-8115L-030; B2005-05-0520J-064
AB The working principle of composite polymer vapor **sensors** is basically to exploit the vapor absorption properties of an insulating polymer whose electrical properties are modulated by a conductive 'filler'. **Carbon black** and graphite powder have already been used as 'filler' materials. In this work we fabricate and characterize vapor **sensors** with a new type of 'filler': carbon nanoparticles obtained by flame synthesis. Electrochemically prepared porous **silicon** with a 40% porosity has been used as the substrate for the carbon growth. Carbon nanoparticles have been characterized by AFM, SEM, FTIR; XRD, diffraction laser spectroscopy, nitrogen isothermal adsorption and visible optical micrography. The carbon structures seem composed of 'units' whose size is in the range 5-20 nm. Composite thin films have been realized using mainly poly(methyl-methacrylate) (PMMA) as polymeric insulating matrix. Thin films of the composite are used to realize chemiresistor sensing devices. The characteristics of the **sensors** responses to volatile organic compounds (VOCs) are related to filler types in order to optimize the sensing device and show the importance of the filler characteristics

L1 ANSWER 18 OF 36 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2004:8158048 INSPEC
DOCUMENT NUMBER: A2004-24-0670-002; B2004-12-7230-031
TITLE: Study and improvement on piezoresistivity of **silicon** rubber/**carbon black** composites
AUTHOR: Wang Peng; Ding Tian-Huai; Xu Feng; Qin Yuan-Zhen (Dept. of Precision Instrum. & Mechanology, Tsinghua Univ., Beijing, China)
SOURCE: Chinese Journal of Sensors and Actuators (2004), vol.17, no.4, p. 15-18, 9 refs.
CODEN: CJXUFT, ISSN: 1004-1699
SICI: 1004-1699(2004)17:4L.15:SIPS;1-2
Published by: Southeast Univ, China
DOCUMENT TYPE: Journal
TREATMENT CODE: Theoretical; Experimental
COUNTRY: China
LANGUAGE: Chinese
AN 2004:8158048 INSPEC DN A2004-24-0670-002; B2004-12-7230-031
AB In order to design and fabricate the flexible force **sensor**, we have researched the piezoresistivity of **silicon** rubber/ **carbon black** composites and given the academic calculation formula between pressure and electrical resistivity. The experiments illustrate that the homogenization of **carbon**

black and the elastic modulus of composites can be improved effectively by dispersing nanosize silica filler and using organic solvent. As a result, the piezoresistivity of composites can be improved. Moreover, the fore-sensitive device fabricated by the composites is free from the limitation of the surface shape of the tested objects which can be widely applied to various squeeze stress measurements on any regular and irregular curve surfaces

L1 ANSWER 19 OF 36 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2004:8115515 INSPEC
DOCUMENT NUMBER: A2004-21-8280T-068; B2004-11-7230L-016
TITLE: Resistivity measurements of carbon-polymer composites in chemical **sensors**: impact of carbon concentration and geometry
AUTHOR: Hua Lei; Pitt, W.G.; (Dept. of Chem. Eng., Brigham Young Univ., Provo, UT, USA), McGrath, L.K.; Ho, C.K.
SOURCE: Sensors and Actuators B (Chemical) (15 June 2004), vol.B101, no.1-2, p. 122-32, 35 refs.
CODEN: SABCEB, ISSN: 0925-4005
SICI: 0925-4005(20040615)B101:1/2L.122:RMCP;1-3
Price: 0925-4005/04/$30.00
Published by: Elsevier, Switzerland
DOCUMENT TYPE: Journal
TREATMENT CODE: Practical; Theoretical; Experimental
COUNTRY: Switzerland
LANGUAGE: English
AN 2004:8115515 INSPEC DN A2004-21-8280T-068; B2004-11-7230L-016
AB Chemiresistor **sensors** comprised of conductive polymer composites have shown great potential in identifying gaseous analytes. The performance of these **sensors** depends on a number of parameters, including the geometry and concentration of the conductive component dispersed in the polymer. In this study, 64 chemiresistors representing eight different carbon concentrations (8-60 volume% carbon) were constructed by depositing thin films of a **carbon black**-polyisobutylene composite onto concentric spiral platinum electrodes on a **silicon** chip. The impact of carbon concentration and geometry on the measured resistance and derived resistivity of the polymer composite was determined. The thickness and surface topography of each **sensor** was measured with a mechanical profilometer, and the resistance of each **sensor** was measured in dry air at room temperature. Finite element modeling was used to correlate the thickness and measured electrical resistance with the intrinsic resistivity of the polymer-carbon composite. The derived resistivity data fit the general effective media (GEM) model adequately, and the fitted parameters predicted values for percolation threshold and carbon resistivity that were consistent with published literature. Further finite element modeling showed that resistivity was a strong function of composite composition and thickness, but was relatively insensitive to the surface roughness of the composite on the **sensor**. The correlations developed herein can be used in reverse to calculate the thickness of the composite polymer film deposited on the solid substrate from a measurement of resistance in dry air

L1 ANSWER 20 OF 36 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2004:7884699 INSPEC
DOCUMENT NUMBER: A2004-07-8280T-032; B2004-04-7230L-035
TITLE: Combined smart chemFET/resistive **sensor** array
AUTHOR: Covington, J.A.; Tan, S.L.; Gardner, J.W.; (Sch. of Eng., Warwick Univ., UK), Hamilton, A.; Koickal, T.; Pearce, T.
SOURCE: Proceedings of IEEE Sensors 2003 (IEEE Cat. No.03CH37498), Vol.2, 2003, p. 1120-3 Vol.2 of 1367 pp., 6 refs.

ISBN: 0 7803 8133 5
Price: 0-7803-8133-5/03/$17.00
Published by: IEEE, Piscataway, NJ, USA
Conference: Proceedings of IEEE Sensors 2003, Toronto, Ont., Canada, 22-24 Oct. 2003
Sponsor(s): IEEE Sensors Council
DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Application
COUNTRY: United States
LANGUAGE: English
AN 2004:7884699 INSPEC DN A2004-07-8280T-032; B2004-04-7230L-035
AB Here we describe a novel CMOS compatible gas **sensor** array based on a combined resistive/chemFET **sensor** cell. We have fabricated an array of 70 **sensors** with integrated drive, gain and baseline removal circuitry using an AMS 0.6 μm CMOS process. The sensing materials are **carbon black**/polymer composite (CB) thin films, which have been previously reported to have good vapour-sensing properties. Different CB films have been deposited onto the **sensor** array and have been shown to respond differently to volatile organic compounds. This combined sensing element both reduces **silicon** area and, more importantly, measures different physical properties of the same gas sensitive material improving discrimination and giving more insight into the sensing mechanism

L1 ANSWER 21 OF 36 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2001:6898099 INSPEC
DOCUMENT NUMBER: A2001-10-8280T-011; B2001-05-7230L-022
TITLE: Micromachined polymer-based chemical gas **sensor** array
AUTHOR: Zee, F.; Judy, J.W. (Dept. of Electr. Eng., California Univ., Los Angeles, CA, USA)
SOURCE: Sensors and Actuators B (Chemical) (25 Jan. 2001), vol.B72, no.2, p. 120-8, 9 refs.
CODEN: SABCEB, ISSN: 0925-4005
SICI: 0925-4005(20010125)B72:2L.120:MPBC;1-F
Price: 0925-4005/2001/$20.00
Doc.No.: S0925-4005(00)00638-9
Published by: Elsevier, Switzerland
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: Switzerland
LANGUAGE: English
AN 2001:6898099 INSPEC DN A2001-10-8280T-011; B2001-05-7230L-022
AB We have developed a miniature polymer-based chemical gas **sensor** array on **silicon** using micromachining technology. The **sensors** are polymer-**carbon black** composite films, which swell reversibly and cause a resistance change upon exposure to a wide variety of gases. We have fabricated two types of devices which can measure this resistance change using a "well" design. These "wells" contain the polymer-**carbon black**-solvent liquid volume present during deposition and allow the **sensor** film to be placed reproducibly in a specific and well-constrained area. After deposition, the solvents evaporate and leave behind a polymer-**carbon black** residue crust between metal leads on each side of the "well". Two types of devices, a bulk micromachined **sensor** and a patterned thick-film **sensor**, have been fabricated, ranging in size from 500 μm+600 μm to 100 μm+100 μm. Since the composite film **sensors** are not specific to any one gas, an array of these **sensors**, each with a different sensing film, is used to identify gases and gas mixtures through the pattern response of the array. Six polymer-**carbon black** composite films were deposited into the **sensor** array and exposed to three chemical gases at five different concentration levels. The **sensors** were able to uniquely detect these gas

vapors and demonstrated a linear response to concentration levels between 2000 and 10,000 ppm. Results also indicate that a reduction in **sensor** area by an order of magnitude (from 4.32 to 0.30 mm2) does not reduce **sensor** response. This design allows the integration of circuits to process the changes in resistance which will permit the realization of a completely integrated miniature gas **sensor**

L1 ANSWER 22 OF 36 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2000:6489448 INSPEC
DOCUMENT NUMBER: A2000-05-0710C-012; B2000-03-7230M-019
TITLE: MEMS chemical gas **sensor**
AUTHOR: Zee, F.; Judy, J. (Dept. of Electr. Eng., California Univ., Los Angeles, CA, USA)
SOURCE: Proceedings of the Thirteenth Biennial University/Government/Industry Microelectronics Symposium (Cat. No.99CH36301), 1999, p. 150-2 of viii+224 pp., 3 refs.
ISBN: 0 7803 5240 8
Price: 0 7803 5240 8/99/$10.00
Published by: IEEE, Piscatatway, NJ, USA
Conference: Proceedings of the Thirteenth Biennial University/Government/Industry Microelectronics Symposium, Minneapolis, MN, USA, 20-23 June 1999
DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Practical; Experimental
COUNTRY: United States
LANGUAGE: English
AN 2000:6489448 INSPEC DN A2000-05-0710C-012; B2000-03-7230M-019
AB We have developed a miniature polymer-based chemical gas **sensor** array on **silicon** using micromachining technology. The **sensors** use conductive polymer-**carbon black** composite films, which swell reversibly and induce a resistance change upon exposure to a wide variety of gases. Using a SU-8 photoresist, we have constructed high aspect ratio wells which can contain the polymer-**carbon black**-solvent liquid volume present during deposition and allow the **sensor** film to be placed reproducibly in a specific and well-constrained area while reducing its overall size. Two sizes of wells, 500+600 μm and 250+250 μm, have been fabricated and tested. Six polymer-**carbon black** composite films were deposited into an array of **sensor** wells and exposed to three chemical gases at five concentration levels. The **sensors** were able to uniquely detect these gas vapors and demonstrated a linear response to the concentration levels. This design allows the integration of circuits to process the changes in resistance which will permit the realization of a completely integrated miniature gas **sensor**

L1 ANSWER 23 OF 36 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2005(46):2685 COMPENDEX
TITLE: Conductive silicone based MEMS **sensor** and actuator.
AUTHOR: Huang, Adam (Mechanical and Aerospace Engineering Department University of California, Los Angeles, CA, United States); Wong, Victor Tak Sing; Ho, Chih-Ming
MEETING TITLE: 13th International Conference on Solid-State Sensors and Actuators and Microsystems, TRANSDUCERS '05.
MEETING ORGANIZER: Korean Sensors Society; IEEE Electron Devices Society, EDS; IEE of Japan, Sensors and Micromachines Society; International Federation of Automatic Control; Institute of Control, Automation and Systems Engineers
MEETING LOCATION: Seoul, South Korea
MEETING DATE: 05 Jun 2005-09 Jun 2005
SOURCE: Digest of Technical Papers - International Conference on Solid State Sensors and Actuators and Microsystems,

TRANSDUCERS '05 v 2 2005.p 1406-1411, (IEEE cat n 05TH8791), arn: 3E4.28
SOURCE: TRANSDUCERS '05 - 13th International Conference on Solid-State Sensors and Actuators and Microsystems - Digest of Technical Papers
ISBN: 0780389948
PUBLICATION YEAR: 2005
MEETING NUMBER: 65909
DOCUMENT TYPE: Conference Article
TREATMENT CODE: Experimental
LANGUAGE: English
AN 2005(46):2685 COMPENDEX
AB In this paper, we have demonstrated the fabrication and preliminary characterization of SU-8 patterned conductive silicone polymer MEMS **sensor** and actuator; in the form of a suspended cross-beam accelerometer and an electrostatic fluidic valve. By integrating our recently developed silicone/**carbon black** composite patterning technique with surface and bulk micromachining technologies, we have exploited the material properties of conductive silicone polymers for active/passive MEMS devices. The cross-beam dimensions of the accelerometer are 7mm * 400mum * 25mum with a 500mum * 500mum * 250mum **silicon** proof mass at the center. Various sizes of the silicone valves (2 electrodes) and pumps (3 electrodes) were fabricated, with the smallest design for the pump measuring 600 mum * 3mm * 35mum. Further size reduction to yield pumps and valves in the order of a hundred micron is possible with our developed fabrication technique. $CPY 2005 IEEE. 11 Refs.

L1 ANSWER 24 OF 36 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2005(44):3148 COMPENDEX
TITLE: SU-8 lift-off patterned silicone chemical vapor **sensor** arrays.
AUTHOR: Wong, Victor T. S. (Department of Mechanical and Aerospace Engineering University of California, Los Angeles, CA, United States); Huang, Adam; Ho, Chih-Ming
MEETING TITLE: 18th IEEE International Conference on Micro Electro Mechanical Systems, MEMS 2005 Miami.
MEETING ORGANIZER: IEEE; Robotics and Automation Society
MEETING LOCATION: Miami Beach, FL, United States
MEETING DATE: 30 Jan 2005-03 Feb 2005
SOURCE: Proceedings of the IEEE International Conference on Micro Electro Mechanical Systems (MEMS) 2005.p 754-757, (IEEE cat n 05CH37610)
SOURCE: Proceedings of the 18th IEEE International Conference on Micro Electro Mechanical Systems, MEMS 2005 Miami - Technical Digest
CODEN: PMEME5 ISSN: 1084-6999
PUBLICATION YEAR: 2005
MEETING NUMBER: 65792
DOCUMENT TYPE: Conference Article
TREATMENT CODE: Theoretical; Experimental
LANGUAGE: English
AN 2005(44):3148 COMPENDEX
AB This paper reports on the fabrication and preliminary characterizations of our micro-machined silicone/**carbon black** chemical vapor **sensor** arrays. By utilizing SU-8 lift-off technique, we have successfully patterned room temperature vulcanizing (RTV) polymers down to 25 mum feature size using low resolution mask (with line-width of 5 - 10mum) with yields in excess of 90% throughout a 4" **silicon** wafer. Based on this technique, we have fabricated the smallest functional polymer/**carbon black** based chemical vapor **sensor** (60*60*25mum3) reported in the literature known to the authors thus far. Preliminary characterizations showed that the

sensors are capable of sensing alcohols and acetone in the range from 2.5ppth to 12.5ppth with response time down to 5 seconds. $CPY 2005 IEEE. 11 Refs.

L1 ANSWER 25 OF 36 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2005(41):4621 COMPENDEX
TITLE: An investigation of polymer-carbon black composite gas **detectors**.
AUTHOR: Sun, Xiaoxiang (Department of Microelectronics System State Key Lab Fudan University, Shanghai 200433, China); Xie, Haifen; Yang, Qiudong; Huang, Yiping
MEETING TITLE: Fifth International Conference on Thin Film Physics and Applications.
MEETING ORGANIZER: Chinese Physical Society, China; Shanghai Physical Society, China; The National Natural Science Foundation of China; East China Normal Univ., School of Inf. Sci. and Technol., China; Fudan University, Applied Surface Physics Laboratory, China; et al.
MEETING LOCATION: Shanghai, China
MEETING DATE: 31 May 2004-02 Jun 2004
SOURCE: Proceedings of SPIE - The International Society for Optical Engineering v 5774 2005.p 620-623
SOURCE: Fifth International Conference on Thin Film Physics and Applications
CODEN: PSISDG ISSN: 0277-786X
PUBLICATION YEAR: 2005
MEETING NUMBER: 65676
DOCUMENT TYPE: Conference Article
TREATMENT CODE: Experimental
LANGUAGE: English
AN 2005(41):4621 COMPENDEX
AB In this paper, we describe the development of novel chemical gas **sensors**. These **sensors** consist of sensitive films and interdigited microelectrodes. The sensitive films are made of insulating polymers mixed with conducting **carbon black**. Interdigitated microelectrodes made of gold are fabricated on the **silicon** by VLSI technology and packaged. With the deposition of different polymer films on the interdigitated electrodes, we can make various polymer-**carbon black** composites chemresistive gas microsensors. When the sensitive films are exposed to organic gases, these films will absorb the gases and swell, that is, the resistance of the films goes to increase. We test two kinds of microsensors exposed in the same concentrations of organic gases. By principle component analysis of responses of microsensors, it is clear that two kinds of the same concentration different gases can be easily discriminated. 6 Refs.

L1 ANSWER 26 OF 36 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2005(24):2179 COMPENDEX
TITLE: Portable electronic nose system based on the carbon black-polymer composite **sensor** array.
AUTHOR: Kim, Yong Shin (Bio-MEMS Team Electronics and Telecommunications Research Institute, Yusong-gu, Daejeon 305-350, South Korea); Ha, Seung-Chul; Yang, Yoonseok; Kim, Young Jun; Cho, Seong Mok; Yang, Haesik; Kim, Youn Tae
SOURCE: Sensors and Actuators, B: Chemical v 108 n 1-2 SPEC. ISS. Jul 22 2005 2005.p 285-291
CODEN: SABCEB ISSN: 0925-4005
PUBLICATION YEAR: 2005
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
LANGUAGE: English
AN 2005(24):2179 COMPENDEX
AB A portable electronic nose system based on personal digital apparatus has

been developed by using the vapor detection array made of **carbon black**-polymer composites and the user software, such as data acquisition and pattern recognition. The gas **sensor** array is possible to have maximum 16 sensing elements integrated on the same **silicon** substrate. The individual element has a Si bulk-micromachined well which allows the polymer-**carbon black** composite solution to be placed reproducibly in a specific and well-constrained area during the drop-coating process. Preliminary results show that our portable electronic nose system has successfully classified simple volatile organic compounds, and the complex liquor samples of brandy and whiskey. $CPY 2004 Elsevier B.V. All rights reserved. 15 Refs.

L1 ANSWER 27 OF 36 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2005(22):14846 COMPENDEX
TITLE: Study and improvement on piezoresistivity of **silicon** rubber/**carbon black** compsoites.
AUTHOR: Wang, Peng (Dept. of Precision Instruments and Mechanology Tsinghua University, Beijing 100084, China); Ding, Tian-Huai; Xu, Feng; Qin, Yuan-Zhen
SOURCE: Chinese Journal of Sensors and Actuators v 17 n 1 2004.p 15-18
ISSN: 1004-1699
PUBLICATION YEAR: 2004
DOCUMENT TYPE: Journal
TREATMENT CODE: Theoretical; Experimental
LANGUAGE: Chinese
AN 2005(22):14846 COMPENDEX
AB In order to design and fabricate the flexible force **sensor**, we have researched the piezoresistivity of **silicon** rubber/**carbon black** composites and given the academic calculation formula between pressure and electrical resistivity. The experiments illustrate that the homogenization of **carbon black** and the elastic modulus of composites can be improved effectively by dispersing nanosize silica filler and using organic solvent. As a result, the piezoresistivity of composites can be improved. Moreover, the fore - sensitive device fabricated by the composites is free from the limitation of the surface shape of the tested objects which can be widely applied to various squeeze stress measurement on any regular and unregular curve surfaces. 9 Refs.

L1 ANSWER 28 OF 36 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2005(17):1605 COMPENDEX
TITLE: A matched-profile method for simple and robust vapor recognition in electronic nose (E-nose) system.
AUTHOR: Yang, Yoon Seok (Bio-MEMS Team Basic Research Laboratory Electronics and Telecom. Res. Inst., Yuseong-gu, Daejeon 305-350, South Korea); Ha, Seung-Chul; Kim, Yong Shin
SOURCE: Sensors and Actuators, B: Chemical v 106 n 1 SPEC. ISS. Apr 29 2005 2005.p 263-270
CODEN: SABCEB ISSN: 0925-4005
PUBLICATION YEAR: 2005
DOCUMENT TYPE: Journal
TREATMENT CODE: Theoretical
LANGUAGE: English
AN 2005(17):1605 COMPENDEX
AB The vapor recognition performance of electronic nose (E-nose) system can be improved by manipulating the **sensor** array responses of vapors in profile forms. The **sensor** array composed of various **carbon-black** (CB) polymer composites shows featured response profile patterns, varied from vapors to vapors due to different chemical interactions between the arrayed materials and the vapors. These

multidimensional sensory data gives more information than collection of the piecemeal signal features, i.e., maximum sensitivity, signal slopes, rising-time. To use them in vapor recognition task, we proposed a novel matched-profile method was proposed, which is based on the typical digital image pattern matching. The degrees of matching between eight different vapors were evaluated by using the proposed method. The vapor responses are measured by the **silicon**-based gas **sensor** array with 16 CB polymer composites installed in membrane structure. The results showed higher contrast between matching and non-matching vapors than conventional method. This implies reliable vapor recognition in E-nose system. $CPY 2004 Elsevier B.V. All rights reserved. 9 Refs.

L1 ANSWER 29 OF 36 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2005(12):3129 COMPENDEX
TITLE: Integrated and microheater embedded gas **sensor** array based on the polymer composites dispensed in micromachined wells.
AUTHOR: Ha, Seung-Chul (Bio MEMS Group Basic Research Laboratory Electronics and Telecom. Res. Inst., Yusong-gu, Taejon 305-350, South Korea); Kim, Yong Shin; Yang, Yoonseok; Kim, Young Jun; Cho, Seong-Mok; Yang, Haesik; Kim, Youn Tae
SOURCE: Sensors and Actuators, B: Chemical v 105 n 2 Mar 28 2005 2005.p 549-555
CODEN: SABCEB ISSN: 0925-4005
PUBLICATION YEAR: 2005
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
LANGUAGE: English
AN 2005(12):3129 COMPENDEX
AB This paper reports a new fabrication method and a performance of miniaturized and temperature-controllable gas **sensor** array constructed on 5 in. double side polished (1 0 0) **silicon** wafer. The films of polymer-**carbon black** composite were used as gas **sensors**. Both **silicon** process and bulk micromachining technology were employed to fabricate **sensor** array equipped with an interdigitated electrode pair, microheater, and micromachined well of an area of 2 mm*2 mm. During dispensing a polymer composite-solvent solution on the electrode, micromachined well helped the **sensor** film be placed in a constrained area and be formed reproducibly from a constant volume of the polymer composite-solvent solution. The dimension of a **sensor** array chip consisting of 16 separate **sensors** is 30 mm*14 mm. The **sensors** of polymer-**carbon black** composite responded diversely when they were dispensed in micromachined wells and exposed to various chemical vapors. Principal component analysis (PCA) clearly demonstrated that the gas **sensor** array could identify various chemical vapors. Pt microheater consumed 7 mW to heat **sensor** film at the operating temperature of 40 deg C, and temperature reached a steady maximum value promptly because of its small heat capacity and effective thermal isolation. The electrical resistance of polymer composite **sensor** and the partition coefficients for **sensor**-vapor interactions showed to be considerably affected by the substrate temperature. $CPY 2004 Elsevier B.V. All rights reserved. 13 Refs.

L1 ANSWER 30 OF 36 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2004(52):7348 COMPENDEX
TITLE: Ultra-fast chemical sensing microsystem employing resistive nanomaterials.
AUTHOR: Tan, Su L. (School of Engineering University of Warwick, Coventry, CV4 7AL, United Kingdom); Covington, James A.; Gardner, Julian W.
MEETING TITLE: Smart Structures and Materials 2004 - Smart Electronics, MEMS, BioMEMS, and Nanotechnology.

MEETING ORGANIZER: SPIE - The International Society for Optical Engineering; American Institute of Aeronautics and Astronautics, AIAA (USA); American Society of Mechanical Engineers, ASME (USA); Society for Experimental Mechanics, SEM (USA); The Boeing Company (USA)
MEETING LOCATION: San Diego, CA, United States
MEETING DATE: 15 Mar 2004-18 Mar 2004
SOURCE: Proceedings of SPIE - The International Society for Optical Engineering v 5389 2004.p 366-376
CODEN: PSISDG ISSN: 0277-786X
PUBLICATION YEAR: 2004
MEETING NUMBER: 64015
DOCUMENT TYPE: Conference Article
TREATMENT CODE: Theoretical
LANGUAGE: English
AN 2004(52):7348 COMPENDEX
AB This paper reports a novel ultra-fast chemosensor array microsystem for the rapid detection of volatile organic compounds (VOCs). The sensing device consists of an array of 80 miniature resistive **sensors** on a 10 mm by 10 mm **silicon** substrate, configured in 5 rows of 16 elements. In this application each row has been deposited with a different **carbon black**/polymer composite nanomaterial. As a result of arranging the **sensors** in the matrix fashion, we are able to represent the **sensor** response as an olfactory image. The **sensor** array was tested with pulses of ethanol, toluene, toluene and ethanol mixture, milk, cream, cypress oil and peppermint oil at two different flow rates (60 and 130 ml/min) and three different pulse widths (10, 25, and 50 sees). Preliminary analysis was performed by comparing different images which showed excellent discrimination between the different analytes. Increasing the pulse width and flow rate improved the discrimination capability of the system. We have also investigated the effect of 'stereo' olfactory imaging by combining mono images measured at different flow rates to form a composite image. Results have shown such scheme can provide additional discriminatory information. 25 Refs.

L1 ANSWER 31 OF 36 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2004(24):9439 COMPENDEX
TITLE: Resistivity measurements of carbon-polymer composites in chemical **sensors**: Impact of carbon concentration and geometry.
AUTHOR: Lei, Hua (Department of Chemical Engineering Brigham Young University 350 Clyde Building, Provo, UT 84602, United States); Pitt, William G.; McGrath, Lucas K.; Ho, Clifford K.
SOURCE: Sensors and Actuators, B: Chemical v 101 n 1-2 Jun 15 2004 2004.p 122-132
CODEN: SABCEB ISSN: 0925-4005
PUBLICATION YEAR: 2004
DOCUMENT TYPE: Journal
TREATMENT CODE: Theoretical; Experimental
LANGUAGE: English
AN 2004(24):9439 COMPENDEX
AB Chemiresistor **sensors** comprised of conductive polymer composites have shown great potential in identifying gaseous analytes. The performance of these **sensors** depends on a number of parameters, including the geometry and concentration of the conductive component dispersed in the polymer. In this study, 64 chemiresistors representing eight different carbon concentrations (8-60vol.% carbon) were constructed by depositing thin films of a **carbon black** -polyisobutylene composite onto concentric spiral platinum electrodes on a **silicon** chip. The impact of carbon concentration and geometry on the measured resistance and derived resistivity of the polymer composite was determined. The thickness and surface topography of each

sensor was measured with a mechanical profilometer, and the resistance of each **sensor** was measured in dry air at room temperature. Finite element modeling was used to correlate the thickness and measured electrical resistance with the intrinsic resistivity of the polymer-carbon composite. The derived resistivity data fit the general effective media (GEM) model adequately, and the fitted parameters predicted values for percolation threshold and carbon resistivity that were consistent with published literature. Further finite element modeling showed that resistivity was a strong function of composite composition and thickness, but was relatively insensitive to the surface roughness of the composite on the **sensor**. The correlations developed herein can be used in reverse to calculate the thickness of the composite polymer film deposited on the solid substrate from a measurement of resistance in dry air. $CPY 2004 Elsevier B.V. All rights reserved. 35 Refs.

L1 ANSWER 32 OF 36 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2004(22):4454 COMPENDEX
TITLE: Fabrication and characterization of carbon nanoparticles for polymer based vapor **sensors**.
AUTHOR: Quercia, L. (ENEA Centro Ricerche Portici, 80055 Portici (NA), Italy); Loffredo, F.; Alfano, B.; La Ferrara, V.; Di Francia, G.
MEETING TITLE: New Materials and Technologies in Sensor Applications, Proceedings.
MEETING LOCATION: Strasbourg, France
MEETING DATE: 10 Jun 2003-13 Jun 2003
SOURCE: Sensors and Actuators, B: Chemical v 100 n 1-2 Jun 1 2004 2004.p 22-28
CODEN: SABCEB ISSN: 0925-4005
PUBLICATION YEAR: 2004
MEETING NUMBER: 62917
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
LANGUAGE: English
AN 2004(22):4454 COMPENDEX
AB The working principle of composite polymer vapor **sensors** is basically to exploit the vapor absorption properties of an insulating polymer whose electrical properties are modulated by a conductive "filler". **Carbon black** and graphite powder have already been used as "filler" materials [Sens. Actuators B87 (2002) 130, Anal. Chem.74 (2002) 1307, Sens. Actuators B66 (2000) 37, Anal. Chem.70 (1998) 2560]. In this work we fabricate and characterize vapor **sensors** with a new type of "filler": carbon nanoparticles obtained by flame synthesis. Electrochemically prepared porous **silicon** with a 40% porosity has been used as the substrate for the carbon growth. Carbon nanoparticles have been characterized by AFM, SEM, FTIR; XRD, diffraction laser spectroscopy, nitrogen isothermal adsorption and visible optical micrography. The carbon structures seem composed of "units" whose size is in the range 5-20nm. Composite thin films have been realized using mainly poly(methyl-methacrylate) (PMMA) as polymeric insulating matrix. Thin films of the composite are used to realize chemiresistor sensing devices. The characteristics of the **sensors** responses to volatile organic compounds (VOCs) are related to filler types in order to optimize the sensing device and show the importance of the filler characteristics. $CPY 2004 Elsevier B.V. All rights reserved. 15 Refs.

L1 ANSWER 33 OF 36 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2004(13):5915 COMPENDEX
TITLE: Combined smart chemFET/resistive **sensor** array.
AUTHOR: Covington, J.A. (School of Engineering University of Warwick, Coventry CV4 7AL, United Kingdom); Tan, S.L.; Gardner, J.W.; Hamilton, A.; Koickal, T.; Pearce, T.

MEETING TITLE: Second IEEE International Conference on Sensors: IEEE Sensors 2003.
MEETING ORGANIZER: IEEE Sensors Council
MEETING LOCATION: Toronto, Ont., Canada
MEETING DATE: 22 Oct 2003-24 Oct 2003
SOURCE: Proceedings of IEEE Sensors v 2 n 2 2003.p 1120-1123, (IEEE cat n 03CH37498)
PUBLICATION YEAR: 2003
MEETING NUMBER: 62434
DOCUMENT TYPE: Conference Article
TREATMENT CODE: Theoretical
LANGUAGE: English
AN 2004(13):5915 COMPENDEX
AB Here we describe a novel CMOS compatible gas **sensor** array based on a combined resistive/chemFET **sensor** cell. We have fabricated an array of 70 **sensors** with integrated drive, gain and baseline removal circuitry using an AMS 0.6 mum CMOS process. The sensing materials are **carbon black**/polymer composite (CB) thin films, which have been previously reported to have good vapour-sensing properties. Different CB films have been deposited onto the **sensor** array and have been shown to respond differently to volatile organic compounds. This combined sensing element both reduces **silicon** area and, more importantly, measures different physical properties of the same gas sensitive material improving discrimination and giving more insight into the sensing mechanism. 6 Refs.

L1 ANSWER 34 OF 36 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2001(32):874 COMPENDEX
TITLE: Conductive rubber materials for pressure **sensors**.
AUTHOR: Hussain, M. (Inst. of Scientific and Indust. Res. Osaka University, Osaka-567-0047, Japan); Choa, Y.-H.; Niihara, K.
SOURCE: Journal of Materials Science Letters v 20 n 6 Mar 15 2001 2001.p 525-527
CODEN: JMSLD5 ISSN: 0261-8028
PUBLICATION YEAR: 2001
DOCUMENT TYPE: Journal
TREATMENT CODE: Theoretical
LANGUAGE: English
AN 2001(32):874 COMPENDEX
AB Over the years, many researchers have studied the resistivity of conductive composites as a function of pressure. However, the use of these materials as pressure **sensors** could not be supported because of the inability to control the sudden resistivity drop and large variation in successive resistivity measurements. This paper discusses the results relating to the fabrication and assessment of some electrical and mechanical properties of **carbon black** filled **silicons** rubber composites as pressure **sensors** for practical applications.(Edited abstract) 13 Refs.

L1 ANSWER 35 OF 36 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2001(10):5956 COMPENDEX
TITLE: Micromachined polymer-based chemical gas **sensor** array.
AUTHOR: Zee, Frank (Univ of California Los Angeles, Los Angeles, CA, USA); Judy, Jack W.
SOURCE: Sensors and Actuators, B: Chemical v 72 n 2 Jan 2001. p 120-128, Elsevier Sequoia SA, Lausanne, Switzerland
CODEN: SABCEB ISSN: 0925-4005
PUBLICATION YEAR: 2001
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
LANGUAGE: English

AN 2001(10):5956 COMPENDEX
AB We have developed a miniature polymer-based chemical gas **sensor** array on **silicon** using micromachining technology. The **sensors** are polymer-**carbon black** composite films, which swell reversibly and cause a resistance change upon exposure to a wide variety of gases. We have fabricated two types of devices which can measure this resistance change using a `well' design. These `wells' contain the polymer-**carbon black**-solvent liquid volume present during deposition and allow the **sensor** film to be placed reproducibly in a specific and well-constrained area. After deposition, the solvents evaporate and leave behind a polymer-**carbon black** residue crust between metal leads on each side of the `well'. Two types of devices, a bulk micromachined **sensor** and a patterned thick-film **sensor**, have been fabricated, ranging in size from 500 mum*600 mum to 100 mum*100 mum. Since the composite film **sensors** are not specific to any one gas, an array of these **sensors**, each with a different sensing film, is used to identify gases and gas mixtures through the pattern response of the array. Six polymer-**carbon black** composite films were deposited into the **sensor** array and exposed to three chemical gases at five different concentration levels. The **sensors** were able to uniquely detect these gas vapors and demonstrated a linear response to concentration levels between 2000 and 10,000 ppm. Results also indicate that a reduction in **sensor** area by an order of magnitude (from 4.32 to 0.30 mm2) does not reduce **sensor** response. This design allows the integration of circuits to process the changes in resistance which will permit the realization of a completely integrated miniature gas **sensor**.(Author abstract) 9 Refs.

L1 ANSWER 36 OF 36 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 1999(48):9634 COMPENDEX
TITLE: MEMS chemical gas **sensor**.
AUTHOR: Zee, Frank (Univ of California Los Angeles, Los Angeles, CA, USA); Judy, Jack
MEETING TITLE: Proceedings of the 1999 13th Biennial University / Goverment / Industry Microelectronics Symposium (UGIM).
MEETING LOCATION: Minneapolis, MN, USA
MEETING DATE: 20 Jun 1999-23 Jun 1999
SOURCE: Biennial University/Government/Industry Microelectronics Symposium - Proceedings 1999.p 150-152
ISSN: 0749-6877
PUBLICATION YEAR: 1999
MEETING NUMBER: 55737
DOCUMENT TYPE: Journal
TREATMENT CODE: Theoretical
LANGUAGE: English
AN 1999(48):9634 COMPENDEX
AB We have developed a miniature polymer-based chemical gas **sensor** array on **silicon** using micromachining technology.The **sensors** use conductive polymer - **carbon black** composite films, which swell reversibly and induce a resistance change upon exposure to a wide variety of gases.Using a SU-8 photoresist, we have constructed high aspect ratio wells which can contain the polymer - **carbon black** - solvent liquid volume present during deposition and allow the **sensor** film to be placed reproducibly in a specific and well-constrained area while reducing its overall size.Two sizes of wells, 500 multiplied by 600 mu m and 250 multiplied by 250 mu m, have been fabricated and tested.Six polymer- **carbon black** composite films were deposited into an array of **sensor** wells and exposed to three chemical gases at five concentration levels.The **sensors** were able to uniquely detect these gas vapors and demonstrated a linear response to the concentration

levels.This design allows the integration of circuits to process the changes in resistance which will permit the realization of a completely integrated miniature gas **sensor**.(Author abstract) 3 Refs.